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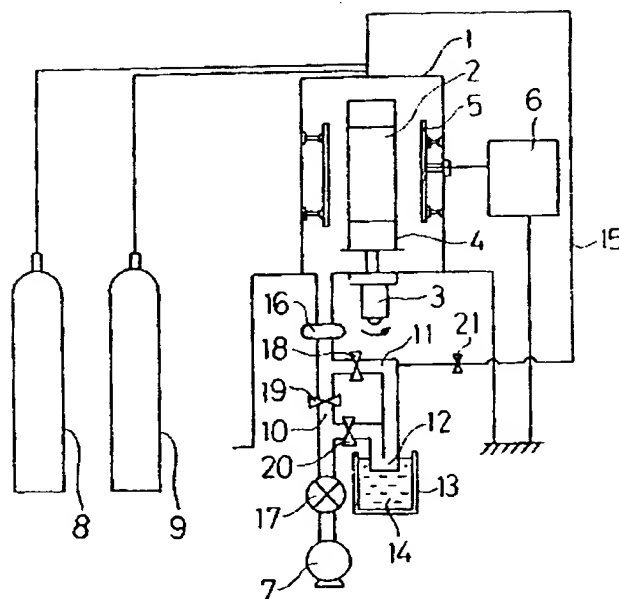
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TITLE : APPARATUS FOR FORMING
AMORPHOUS SILICON FILM



ABSTRACT : PURPOSE: To improve the utilization efficiency of silane gas in the formation of an amorphous silicon (a-Si) film by the plasma CVD process, by removing hydrogen from the exhaust gas of the reaction chamber, and recycling the silane gas to the chamber.

CONSTITUTION: A bypass circuit 11 furnished with a hydrogen removing means consisting of a gas trap 12 cooled by liquid nitrogen 14 is attached to the main exhaust circuit. The operation of the apparatus is carried out as follows. (1) The valves 1 and 21 are closed, the valves 17, 19 and 20 are opened, and the system is evacuated with the pumps 7 and 16. (2) Liquid nitrogen 14 is charged to the vessel 13 to cool the gas trap 12, and SiH_4 gas, etc. is introduced into the reaction chamber 1 and decomposed by plasma to deposit an a-Si film on the substrate plate 2. (3) The valve 18 is opened, the valve 19 is closed, the exhaust gas is introduced to the bypass circuit 11 to collect the SiH_4 gas, etc. in the gas trap 12, and the hydrogen gas mixed in the exhaust gas is discharged from the valve 17. (4) The valves 18 and 20 are closed, the valves 19 and 21 are opened, and the liquid nitrogen is removed from the trap. The SiH_4 gas, etc. evaporated according to the temperature increase of the trap 12 is supplied to the reaction chamber 1 through the feed-back circuit 15.

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